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PRELIMINARY

Harbors -- Planning -- Ca -- SF ba
POTENTIAL PORT CAPACITIES

FOR THE

SAN FRANCISCO BAY AREA

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NORCAL - 3

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Prepared for
THE NORTHERN CALIFORNIA PORTS AND
TERMINALS BUREAU, INC.

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by

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CHAPTER I

INTRODUCTION

The Northern California Ports and Terminals Bureau, Inc. (NORCAL) has undertaken studies to investigate the long-term need for facilities to accommodate international and domestic shipping in the San Francisco Bay Area. This report (NORCAL-3) provides additional information on the ability of the NORCAL ports to meet the projected requirements during the planning period that extends to the year 2020.

The initial NORCAL studies undertook two major thrusts. The first, included in a report known as NORCAL-1, provided for estimates of the foreign and domestic waterborne cargo excluding crude petroleum that could be projected to pass through the Bay Area in the planning period. The second, NORCAL-2, provided current port capacities for handling cargoes with emphasis on dry cargo facilities and excluding crude petroleum terminals.

These two studies were summarized in a report that provided a preliminary analysis of short- and long-range future needs of the San Francisco Bay Area for port handling capacities in which future estimated needs for cargo transfer facilities in Bay Area ports were measured against current handling capacities of existing facilities. In that Summary Report, therefore, it was possible to visualize estimates of the additional capacity that would be required in the future and the types of facilities that would be necessary in order to meet the cargo projections.

These first-phase studies were formulated to provide the basic data for further development of plans for meeting regional port needs. The NORCAL studies provided the bases for development of a cooperative approach by interested entities in the Bay Area to the problem of maintaining and improving the area's role as a major shipping point for waterborne commerce by providing for efficient utilization of natural and man-made facilities available. The studies also provided the basic information necessary to demonstrate the need for additional port facilities to maintain a viable regional port system in the Bay Area.

The purpose of this report is to project the maximum potential throughput capacity that the NORCAL ports envision as possible by the year 2020. This total projected potential throughput capacity then is measured against the requirements previously established in NORCAL-1 in order to provide a broad perspective of the potentials for meeting future cargo requirements. Some of the results of the Phase I studies by the Metropolitan Transportation Commission (MTC) and the Bay Conservation and Development Commission (BCDC) are also included.

NORCAL is a non-profit California corporation organized to provide for cooperation among the ports of northern California in joint endeavors as determined by its Board of Directors. The NORCAL ports included in this study are


1. Encinal Terminals (Alameda)
2. Benicia Port Terminal Company
3. Port of Oakland

4. Port of Richmond

5. Port of San Francisco

Other members of NORCAL are the ports of Sacramento and Stockton and the Solano County Development Agency and the Contra Costa County Development Association.

In this report the term Northern California Area includes all of the region included and served through the Golden Gate. Cargo projections include tonnages expected at all facilities in the region--not merely those utilizing the ports of NORCAL members. The San Francisco Bay Area includes the port facilities in the northern California region except the ports of Sacramento and Stockton. The "NORCAL ports" include the five ports listed above, i.e., the privately owned ports of Encinal Terminals and the Benicia Port Terminal Company and the publicly owned ports of Oakland, Richmond and San Francisco.



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CHAPTER II

PORT REQUIREMENTS

The dry cargo projections of foreign and domestic trade for the San Francisco Bay Area are shown in Table 1. These projections were taken from NORCAL Summary Phase I report; they represent the best range of values of port requirements that NORCAL has been able to develop to date. The rationale for these projections is shown in detail in NORCAL-1.

The report on Phase I of the MTC/BCDC report, which has been tentatively approved by the Seaport Advisory Committee in May 1977, shows variations from the projections developed by NORCAL; they are presented herein for comparison; the MTC/BCDC projections are shown in Table 2.

It should be noted that the MTC/BCDC planning was limited to projections to the year 2000 instead of 2020 used in the NORCAL reports.

These projections have been recorded here to facilitate comparison with the potential throughput capacity of the NORCAL ports.

CHAPTER III

THROUGHPUT CAPACITIES

The annual estimated throughput capacities of the NORCAL ports are shown in Table 3. These capacities were derived from detailed studies made in NORCAL-2 and were presented in that report and the Summary Phase I Report of NORCAL studies.

An analysis of the potential throughput capacity of the NORCAL ports has been based on the maximum potential development of the areas currently under port jurisdiction. The lands included in this analysis are areas currently in use by the NORCAL ports and areas that the ports have under their control including submerged lands that could be adapted to port use in the future. Exceptions to these general guidelines were made in two specific cases: (1) the area of Hunters Point Naval Shipyard that might be made available to the Port of San Francisco for development; and (2) certain areas of the Oakland Army Base that are currently under negotiation to determine their availability to the Port of Oakland for future development. Other contiguous lands that may or may not become available to the ports including military installations were not included in this analysis.

The facilities envisioned in this analysis are shown in several areas in the Bay Area designated in the Location Map. Figures 1 through 7 show the overall scheme for development of these facilities. Included are the general categorizations for port development of (a) container/LASH/RORO facilities; (b) general

cargo break bulk facilities; (c) dry bulk facilities; (d) liquid bulk facilities; and (e) non-specified areas. Some facilities are shown in more than one category because they will be utilized for a mixture of uses. The areas delineated represent a preliminary evaluation of the feasible alternatives available as determined by the ports. It is possible and probable that variations of these categories will occur as future planning continues, based on the requirements of shippers and shipping companies, the development of new technology, the economics of competitive developments both within the Bay Area and with other West Coast ports, as well as the institutional, economic, financial, environmental and socio-political constraints on the utilization of each of the areas.

The analyses were based on the depths of water available alongside the new facilities whether in natural depths or based on channels that need to be dredged. Berthing areas were estimated to accommodate reasonable growth in size of ships during the planning period. Backup land areas were estimated to meet needs based on current technology. Consideration was given to the availability of intermodal facilities for transfer to surface transportation making maximum use of existing facilities. In cases where significant amounts of fill of the Bay are shown, the outlines describe the outer limits of potential development and have been established without a determination of the economics of constructing fills based on complete engineering analysis. In general the port areas show development that is not inconsistent with the Bay Plan of the San Francisco Bay Conservation and Development Commission.

Based on the preliminary port development plans shown in Figures 1 through 7, an estimate of the throughput capacity of the NORCAL ports was made. In order to facilitate future comparisons, the throughput capacity per berth that was used in the Phase I MTC/BCDC report have been used to evaluate the throughput capacity of the ports. The factors used are summarized in Table 4. It should be emphasized that the throughput capacities are an estimate of the future ability of ports to handle cargo in typical berths considering developments in management, techniques, and equipment for the intermodal transfer of cargoes.

Based on the layout shown in Figures 1 through 7 and the unit throughput capacities indicated in Table 4, a summary of the annual potential throughput capacities of the NORCAL ports is included as Table 5.

CHAPTER IV

CONCLUSIONS

Based on the analysis of the potential throughput capacities of the NORCAL ports, a measure of the ability of these ports to meet the future requirements can be made. The following conclusions are indicated:

1. The ports if developed to the potential shown in Figures 1 through 7 would be able to meet the median projections for port requirements through the year 2000 shown in Table 1 (49,564 tons vs 43,000 tons). Within the limits of accuracy of the cargo projections and estimated throughput capacities, these figures demonstrate a near-balance of requirements and capacity.
2. This potential development is less than the NORCAL low projection of total port requirements for the year 2020 (49,564 tons vs. 60,000 tons). It is also less than the projection reported in the Phase I MTC/BCDC report as the level expected for development in the San Francisco Bay Area by 2020 (58,000 T from Table 6).
3. Based on this preliminary analysis, it may be concluded that there is not an immediate need to study in detail specific facility locations in the Bay Area since existing ports (primarily NORCAL ports) can develop the facilities to meet projected needs.

4. However it is also apparent that the total annual potential throughput capacity of existing ports will not meet the long-term needs of the Bay Area. Therefore a general analysis of the criteria for future port development planning is needed.
5. The analysis shows that although there could be approximately the appropriate amount of LASH/container/RORO capacity, that there will be less than adequate capacity for break-bulk and neo-bulk cargoes as one category and a far greater shortfall in capacity to meet the needs for dry bulk facilities.

Since the choice of facilities determined for each port was based on the best possible utilization of each individual berth, it will be possible to vary the mix of facilities developed to meet specific needs. Whereas existing plans show the development of new container facilities to replace existing break-bulk facilities, if in fact the break-bulk facilities are being utilized fully to meet cargo handling demands, it is probable that those facilities will not be converted as planned.

The special needs for dry bulk facilities to meet specific large tonnage requirements, although contemplated in a general way in the projections from NORCAL-1, were not derived to meet the specific needs of development for a major commodity to be shipped in very large amounts, e.g., a coal facility.

Likewise the split of capacities between the various NORCAL ports, and in fact among other ports in northern California, is not circumscribed within the limits shown in this preliminary report. However, the report does illustrate that maximum development of all existing port areas in the Bay Area will be required in order to meet the projected needs for the throughput of dry cargo through the year 2020.

Table 1

NORTHERN CALIFORNIA AND SAN FRANCISCO BAY
 DRY CARGO PROJECTIONS
 FOREIGN AND DOMESTIC
 MILLIONS OF SHORT TONS

	1973	1980			1990			2000			2020		
		H	M	L	H	M	L	H	M	L	H	M	L
Northern California	13.7	25	18	12	49	36	21	89	58	33	270	164	81
S.F. Bay Area	10.2	19	14	9	37	27	16	66	43	25	200	122	60
Break-bulk	3.7	6	4	3	6	4	3	8	5	3	23	14	7
Dry bulk	3.2	5	4	2	7	6	3	12	8	5	38	23	11
Contain/LASH/RORO	3.3	8	6	4	24	17	10	46	30	17	139	85	42

Source: Table IV Summary Phase I report
 From Tables LVI, LVIII, LVIX*, NORCAL-1

*Rounded - H = High Projection
 M = Medium Projection
 L = Low Projection

Table 2

ALTERNATE WATER BORNE COMMERCE FORECASTS
ADOPTED FOR PLANNING PURPOSES
SAN FRANCISCO BAY AREA
(MILLIONS OF SHORT TONS)

Cargo Type	1980	1985	1990	1995	2000
TOTAL DRY CARGO*	13.5 13.5	16.8 19.4	20.8 27.0	25.6 34.9	31.0 43.0
Container/LASH/RORO	6.1 6.0	8.6 10.5	11.4 16.8	15.0 23.4	18.9 30.0
Break-bulk	3.5 3.9	3.5 4.1	3.7 4.2	4.0 4.5	4.0 5.0
Dry bulk	3.9 3.6	4.7 4.8	5.6 6.0	6.6 7.0	8.0 8.0
NEOPETROLEUM LIQUID BULK	0.5	0.7	0.9	1.2	1.4

* Disaggregations of dry cargo forecasts are based on the Corps' cargo mix for the lower forecast (top number) and the NORCAL cargo mix for the higher forecast (bottom number).

Source: Table 7, Metropolitan Transportation Commission and Bay Conservation and Development Commission Phase I report

Table 3
 SAN FRANCISCO BAY AREA
 1975
 ANNUAL THROUGHPUT CAPACITY
 (THOUSANDS OF SHORT TONS)

	San Francisco	Oakland	Other	Total
Break-bulk	1,400	430	368	2,198
Neobulk	784	580	436	1,800
LASH/container/RORO	1,100	3,726	344	5,170
Dry bulk	230	150	340	720
Liquid bulk	402	320	1,070	1,792
Total	3,916	5,206	2,558	11,680

Note: These capacities are dictated by the most restrictive constraint at each terminal.

Source: Table III, NORCAL Summary Phase I Report and Table 2, NORCAL-2.

Table 4

AVERAGE CAPACITY FACTORS
USED IN ESTIMATING THE CAPACITY
OF NEW OR MODIFIED TERMINALS

Terminal Type	Berth Capacity (tons/berth/year)	Gross Area Capacity (tons/sq ft/year)
Container/LASH/RORO	530,000	0.76
Break-bulk	85,000	2.20
Neo-bulk	160,000	0.87
Dry bulk	280,000	3.10
Liquid bulk	390,000	3.20

Source: Table 3, MTC/BCDC Phase I report.

Table 5

SAN FRANCISCO BAY AREA
ANNUAL POTENTIAL THROUGHPUT CAPACITY
(THOUSANDS OF SHORT TONS)

	San Francisco	Oakland	Other	Total
Break-bulk	2,720	680	340	3,740
Neobulk	784	640	320	1,744
Container/LASH/RORO	9,010	23,320	10,070	42,400
Dry bulk	<u>280</u>	<u>280</u>	<u>1,120</u>	<u>1,680</u>
	12,794	24,920	11,850	49,564

Table 6

WATERBORNE COMMERCE FORECASTS
SAN FRANCISCO BAY AREA
(MILLIONS OF SHORT TONS)

	1973	1980	1990	2000	2020
DRY CARGO	10.2	--	--	--	--
Corps		14.2	--	31.8	54.9
NORCAL		13.5	27.0	43.0	122.0
Consultant		13.5	20.8	31.0	58.5
NON-PETROLEUM LIQUID BULK					
Corps		0.515	0.93	1.395	--

Source: Figure 4, MTC/BCDC Phase I report.



LOCATION MAP

map 1







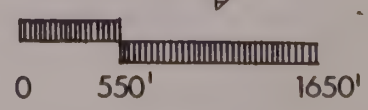


PORT OF OAKLAND PORT OF ALAMEDA

Figure No. 1

LEGEND:

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|---|----------------------|---|---------------|
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|  | liquid |  | non-specified |








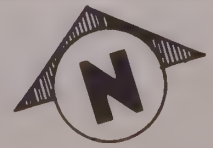


PORT OF OAKLAND

Figure No. 2

LEGEND:

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|  | dry |  | non-specified |
|  | liquid | | |








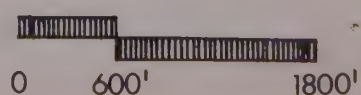


PORT OF SAN FRANCISCO

Figure No. 3

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|  | liquid | | |



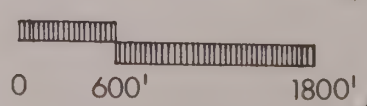
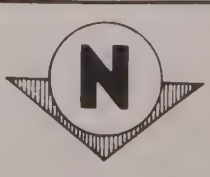


PORT OF SAN FRANCISCO

Figure No. 4

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


- diagonal lines container/lash/ro-ro
- cross-hatching dry
- grid pattern break bulk
- dotted pattern liquid
- diagonal line non-specified





PORT OF RICHMOND

LEGEND:

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|  | container/lash/ro-ro |  | break bulk |
|  | dry |  | liquid |
|  | liquid |  | non-specified |

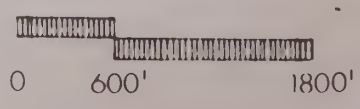
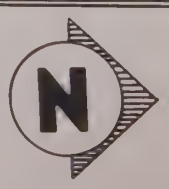
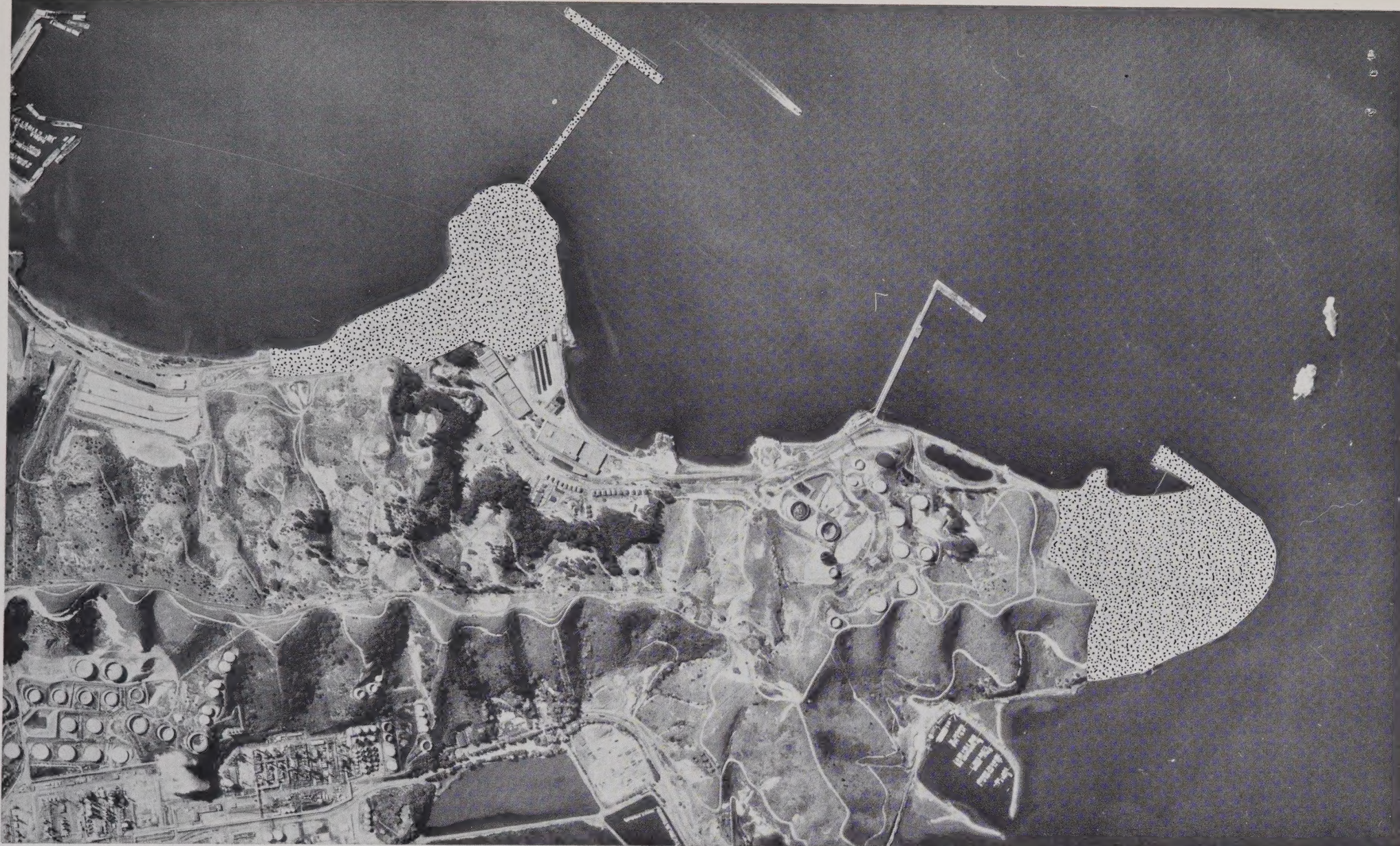







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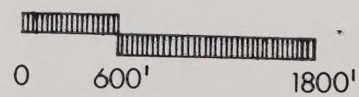


PORT OF RICHMOND

Figure No. 6

LEGEND:

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|  | liquid |  | non-specified | | |









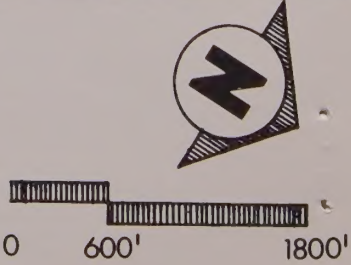


PORT OF BENICIA

Figure No. 7

LEGEND:

- | | | | |
|---|----------------------|---|---------------|
|  | container/lash/ro-ro |  | break bulk |
|  | dry |  | liquid |
|  | liquid |  | non-specified |



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